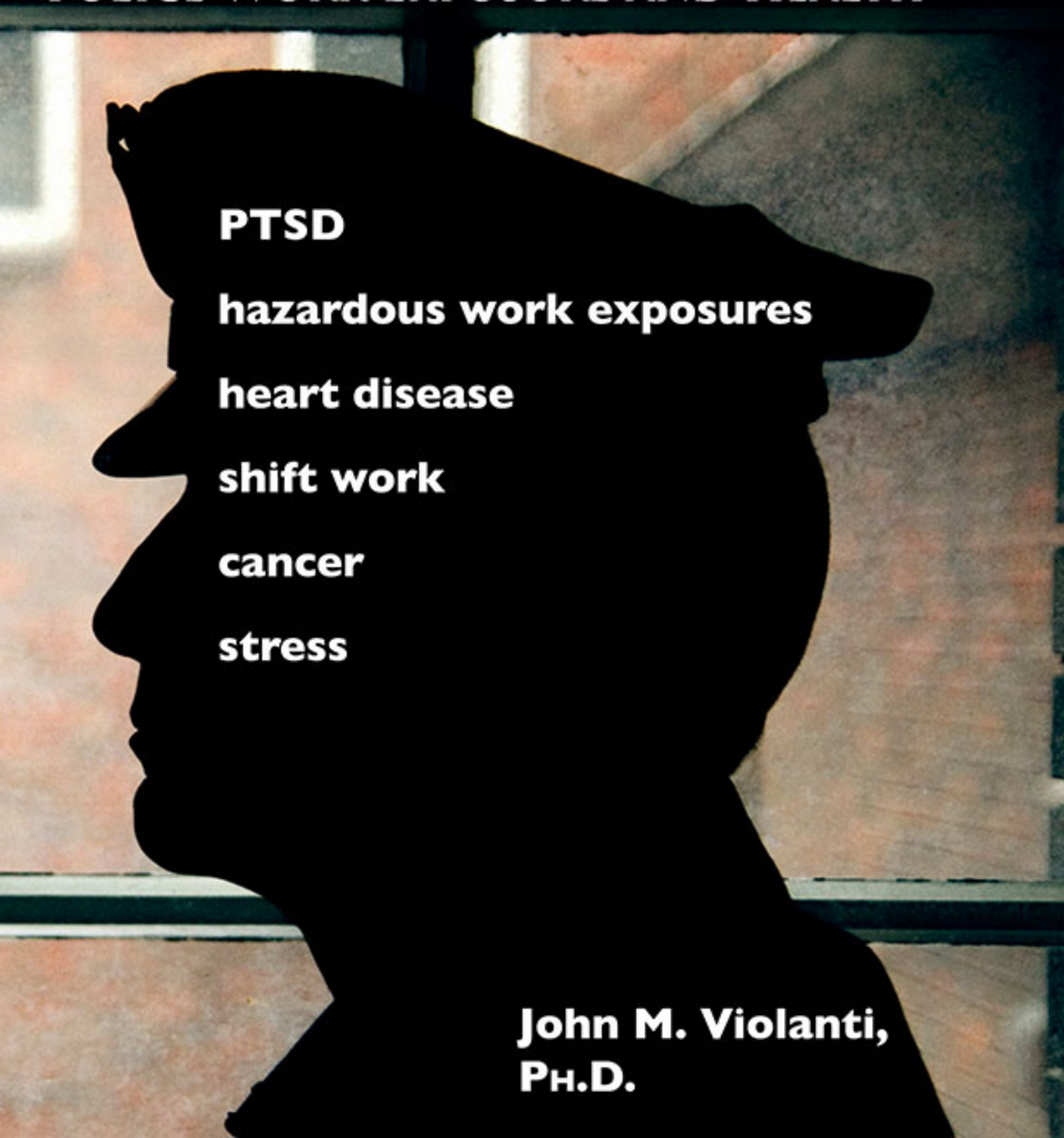
# DYING FOR THE JOB

## Police Work Exposure and Health




John M. Violanti, Ph.D.

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## Police Work Exposure and Health

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*This Book Is Dedicated to Those Who Protect and Serve.*
*Thank You for What You Do.*
*Stay Well.*

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**Claudia Ma, MPH,** is an epidemiologist in the Biostatistics and Epidemiology Branch within the Health Effects Laboratory Division of NIOSH at the CDC. Her research focus is occupational epidemiology. She is currently investigating the role of physical and psychosocial exposures in subclinical cardiovascular disease in working populations.

**Erin C. McCanlies, PhD, MPH, MA (Counseling),** is an epidemiologist in the Biostatistics and Epidemiology Branch within the Health Effects Laboratory Division at NIOSH at the CDC. Her research interests focus on investigating the etiology and treatment of PTSD, investigating parental occupa-

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**Douglas Paton, PhD, C Psychol,** is a Professor in the School of Psychology, University of Tasmania and a Research Fellow at the Joint Centre for Disaster Research in New Zealand. He is a technical advisor on risk communication to the World Health Organization and a member of the Integrated Research for Disaster Reduction (IRDR) committee established as part of the United Nations International Strategy for Disaster Reduction (UN-ISDR) to

coordinate research and intervention development for disaster risk communication. He is an expert of international standing (Australian Research Council) and a member of an expert working group of the Australian National Mental Health Disaster Response Taskforce. In 2005, he was the Australian representative on the UNESCO Education for Natural Disaster Preparedness in the Asia-Pacific program established to learn and disseminate lessons from the 2004 Indian Ocean tsunami. His research focuses on developing and testing models of community and organizational preparedness and resilience (adaptive capacity) for disasters. His work adopts an all-hazards, cross-cultural approach with work being undertaken in Australia (bushfire, flooding, tsunami), New Zealand (earthquake, volcanic eruption), Japan (earthquake, volcanic hazards), Indonesia (volcanic hazards), Taiwan (earthquake, typhoon), and Portugal (bushfire).

**John E. Vena, PhD,** is the Head of the Department of Epidemiology and Biostatistics and University of Georgia Foundation Professor in Public Health at the College of Public Health, University of Georgia. From 2003 to 2008 he served as Professor and Chair of the Department of Epidemiology and Biostatistics at the Arnold School of Public Health at the University of South Carolina. Dr. Vena was Professor of Social and Preventive Medicine at the State University of New York at Buffalo, School of Medicine and Biomedical Sciences, a research fellow at Roswell Park Cancer Institute (1981–2003), and Director of the Environment and Society Institute (1999–2003). Dr. Vena received his BS in Biology from St. Bonaventure University and his MS and PhD degrees in Epidemiology from the State University of New York at Buffalo. Dr. Vena is a Fellow of the American College of Epidemiology and the American Epidemiological Society, a member of the International Society for Environmental Epidemiology, Society for Epidemiologic Research, and the American Public Health Association (APHA). He has published extensively in the field of environmental and occupational epidemiology, and his studies have included descriptive and analytic studies of air and water pollution; bladder cancer and drinking water contaminants; occupational exposures; health of municipal workers, including firefighters and police officers; diet; electromagnetic fields; and persistent environmental toxicants. His current grant activities are funded by the Georgia Cancer Coalition and the National Institutes of Health on the topics of environmental determinants of cancer and systemic lupus erythematosus (SLE); physical activity, stroke, and cognitive function; stress and cardiometabolic disease in police; biomarkers of second-hand smoke (SHS); long-term lung health after exposure to chlorine gas; and health effects of persistent organic pollutants. Since 1981, Dr. Vena has taught courses in epidemiological methods and applications in occupational health and in environmental health and has mentored graduate students, postdoctoral fellows and junior faculty.

**John M. Violanti, PhD,** is a Full Research Professor in the Department of Social and Preventive Medicine (SPM), School of Public Health and Health Professions, at the university at Buffalo, NY, and has been associated with this department for twenty-five years. Dr. Violanti is a member of the University at Buffalo, NY, Medical School graduate faculty. Prior to his position at Buffalo, he also was a Full Professor at the Rochester Institute of Technology, Department of Criminal Justice. He is a police veteran, serving with the New York State Police for twenty-three years as a trooper, a member of the Bureau of Criminal Investigation, and coordinator for the Psychological Assistance Program for the State Police. Dr. Violanti served in the U.S. Army, 57th Military Police Company from 1963–1966. He has been involved in the design, implementation, and analysis of numerous suicide, stress, and health studies over the past twenty-five years. Dr. Violanti has authored over fifty peer-reviewed articles and sixteen books on suicide, stress, and PTSD. He has lectured nationally and internationally at academic institutions on matters of suicide, stress, and trauma at work.

**Michael Wirth, PhD,** is currently a Postdoctoral Fellow at the Cancer Prevention and Control Program, Arnold School of Public Health, University of South Carolina. Dr. Wirth received his BS in Biology from Wingate University with a minor in Environmental Biology. During his time as an undergraduate, he had an opportunity to spend a summer at the Wadsworth Center in Albany, NY, as part of a Research Experiences for Undergraduates program working in a microbiology laboratory. Dr. Wirth completed both his MS in Public Health and PhD in Epidemiology at the Arnold School of Public Health, University of South Carolina. Part of his doctoral schooling and work was supported by the Behavioral-Biomedical Interface Program, which is funded in part by training grant T32-5R18CE001240 from the National Institute of General Medical Sciences. In addition, he is currently a member of the APHA. Dr. Wirth's research interest focuses on circadian disruption, especially among shift-work populations, such as police officers. He has either published or is currently working on several manuscripts utilizing police officer populations. One such publication, which was published in *Chronobiology International*, entitled "Shiftwork Duration and the Awakening Cortisol Response Among Police Officers" was awarded honorable mention for the 2012 Alice Hamilton Award from NIOSH, Epidemiology and Surveillance Category. In addition, his focus on circadian disruption extends to cancer outcomes or factors associated with cancer outcomes. In his postdoctoral work, Dr. Wirth is also currently involved in numerous projects focusing on the effect of diet and physical activity on chronic disease outcomes, including cancer. He has a strong interest in incorporating these lifestyle factors with his research on circadian disrupters (e.g. shift work or sleep disruption).

**Oliver Wirth, PhD,** is a Research Psychologist in the Engineering and Control Technology Branch within the Health Effects Laboratory Division of NIOSH at the CDC. His research interests focus on behavioral factors associated with occupational safety and health. He is currently investigating the role that service animals can play in helping military veterans with PTSD return to civilian life and work.

**Franklin H. Zimmerman, MD, FACC, FACP, FAACVPR,** is a graduate of Brown University Medical School and trained at Columbia University, St. Luke's Hospital in New York. He is a Senior Attending Cardiologist and Director of Critical Care at Phelps Memorial Hospital in Sleepy Hollow, NY, and Assistant Clinical Professor of Medicine at Columbia University. Dr. Zimmerman is actively involved in clinical medicine with an interest in preventive cardiology and patient education. He has authored numerous research articles and two textbooks of electrocardiography. He has served on the editorial board of the *American Journal of Medicine and Sports* and as a reviewer for leading cardiology journals. Dr. Zimmerman is the founding, Co-Editor-in-Chief of the award-winning national consumer heart-health newsletter, *Heart & Health Reports*. He is a member of the board of directors of Phelps Memorial Hospital Center and the Hypertension Education Foundation and is the founding director of the Heart and Health Education Foundation. Dr. Zimmerman's current research interest is preventing cardiovascular disease in police and fire department personnel.

# PREFACE

When one thinks of police work, the immediate danger of this occupation comes to mind. Certainly, law enforcement personnel are subject to the everyday threat of violence, death, and witnessing traumatic events in their work. Less noted, however, is the physical and psychological danger associated with police work, including harmful environmental exposure, stress, and trauma. Based on research, we believe that the adverse health and psychological consequences of this occupation far outweigh the dangers of the street. The primary purpose of this book therefore is to focus on these less-known, less–talked about dangers in policing. The mental well-being, health, and average life span of police officers appear to be affected by these factors.

Hence, the title *Dying for the Job* reflects not so much the danger on the street but more the hidden health dangers associated with policing. Many of the researchers who contributed to this book are epidemiologists and biostatisticians who are part of a NIOSH, CDC, five-year research study on police health titled the *Buffalo Cardio-Metabolic Occupational Police Stress (BCOPS)* study. Still other contributors are experts in cancer, cardiovascular disease, and psychological trauma.

We begin our exposé of police health in Chapter 1 with a discussion of hazardous physical exposures that police officers experience in their daily work. For example, officers are often exposed to chemical hazards in the line of duty. Chemical hazards are classified as solids, liquids, or gases that most commonly enter the body by inhalation, ingestion, or absorption through the skin. Biological hazards include infectious microorganisms, plant or animal toxins, and animals. Microorganisms may (1) cause diseases such as viral hepatitis; (2) cause allergic reactions, such as those associated with molds; (3) deplete oxygen; or (4) produce toxic gases. Animals may attack officers and transmit infections to officers and others at the scene (for example, rabies).

As evidenced by police mortality studies, prevalent diseases associated with chemical exposure include lung disease, cardiovascular abnormalities, skin rashes, and blood-related diseases.

In Chapter 2, Hartley and colleagues discuss health disparities between the police and general U.S. population. Key studies on police officer health, including findings from the five-year BCOPS study conducted for NIOSH, CDC, were compared with results from studies of other U.S. employed adults. Police officers were found to have higher levels of traditional cardiovascular disease risk factors, including more current smokers, and higher levels of obesity, hypertension, and dyslipidemia, than other U.S. employed adults. Officers also had a higher prevalence of the nontraditional risk factors like depression, sleep insufficiency, and shift work.

Zimmerman discusses the association of police work and cardiovascular disease in Chapter 3. According to national data, police officers are at higher risk for death from cardiovascular disease than is the general U.S. population. Doctor Zimmerman outlines the atherosclerotic process, defines risk factors for cardiovascular disease, and compares risk factors between the police and the general population. He suggests that law enforcement agencies promote a culture of wellness, supporting personal health.

In Chapter 4, Wirth, Vena, and Burch conducted a comprehensive review of studies concerning cancer and the police. The majority of these studies suggest that police officers are at higher risk for various types of cancer. Significant increases in mortality among police officers were noted due to all types of cancers combined, digestive organ malignancies; cancer of the esophagus, colon, kidney, bladder, brain, lymphatic and hematopoietic tissues, endocrine glands, and breasts; as well as testicular cancer, melanoma, and Hodgkin's disease. The authors suggest that police work is associated with exposure to a variety of carcinogenic agents, lifestyles, or risk factors, such as shift work, poor diet or a lack of physical activity leading to obesity, alcohol consumption, and air pollution exposure, all of which may increase the risk of cancer.

Baughman and colleagues in Chapter 5 discuss the impact of shift work on police officer health and social well-being. Shift work is a recognized physical and psychological challenge to worker health and performance and is a far-reaching exposure in occupational health. Rearrangement of sleep and work time can have a vast impact not only upon police officers but also upon their families and the people that

they seek to protect and serve. The authors suggest that police agencies provide training to improve sleep and diet factors associated with shift work.

Women have been a part of law enforcement for many years, but primarily as support persons. It was not until the 1970s that women participated in police work as equal patrol officers who performed the same work as male officers. In Chapter 6, Hartley and colleagues discuss the additional stressors and some of the health consequences found to be prevalent among policewomen. The authors note that very little research has been conducted on policewomen's health and stress and suggest a national agenda for such research.

Chapter 7 briefly discusses one of the more fatal consequences of stress and trauma in police work – suicide. Violanti outlines various research studies conducted on police suicide, as well as a psychosocial etiology of suicide within the police role. Suggestions are made for prevention efforts.

Within the context of total worker health, Paton and Norris discuss the influence of family and organization on police trauma in Chapter 8. They propose that certain characteristics of family and organization can act as facilitators of resiliency, thus ameliorating the pathogenic impact of traumatic stress in police work. The authors conclude that active factors like peer support, supervisor support, organizational culture, trust, empowerment and family dynamics are amenable to change and offer the potential for their being managed as part of a proactive organizational traumatic stress risk-management strategy.

In Chapter 9, Andrew and colleagues discuss the protective effect of resiliency on police psychological trauma. The authors discuss resiliency in terms of hardiness, psychological flexibility, and attachment. Social support is seen as a key factor in the social context of increased resiliency. Organizational implementation of resiliency training is discussed.

Police officers are repeatedly exposed to traumatic situations, including motor vehicle accidents, armed conflicts, and witnessing violent death, across their working lives. Such exposure leaves them highly susceptible to posttraumatic stress. In Chapter 10, McCanlies and colleagues provide a comprehensive overview and treatment of PTSD as it may be applied to police work. Additionally, they discuss the probable physical outcomes that may be associated with PTSD.

Treatment for groups at increased risk for PTSD is the subject of Chapter 11. McCanlies and colleagues discuss the various treatment approaches that are generally utilized in high-risk groups and how they may be applied to police work.

We sincerely hope that this book will add to the reader's understanding of some of the "hidden dangers" in police work. At a recent Law Enforcement Executives Summit that the editor of this book attended (Dr. Violanti), United States Attorney General Eric Holder Jr. stated that officer safety and wellness is a high priority. Among his concerns were the health consequences and traumatic stress on police personnel. Additionally, recent events such as 9/11, Hurricane Katrina, the Sandy Hook school tragedy, and the Boston Marathon bombings emphasize the need to have a vibrant, healthy police force. The police performed admirably during these national tragedies, and it is necessary to maintain this high level of reliability by initiating health and stress prevention efforts. The brave men and women who serve this vital societal service deserve no less.

J.M.V.

# CONTENTS

# DYING FOR THE JOB

# Chapter 1

# POLICE WORK MAY BE HAZARDOUS TO YOUR HEALTH: AN EXAMINATION OF HARMFUL PHYSICAL WORK EXPOSURES

JOHN M. VIOLANTI

There is an immediate need to study the exposure risk of law enforcement practitioners, focusing on the causal relationship between occupational exposure of practitioners and increased incidence of health problems and disease. As an occupational group, law enforcement officers have greater morbidity and mortality rates than the general public has, principally due to cancer and cardiovascular disease (Violanti, Vena & Petralia, 1998). Various law enforcement agencies have calculated the cost of inservice-related disease to be between $400,000 and $750,000. Surveys suggest work-related disease accounts for 20 to 50 percent of early retirements. For the law enforcement agency, good health represents a sound investment. Studies of law enforcement officers indicate that healthy officers have 40 to 70 percent less *absenteeism* than officers with health problems (Commission on Accreditation for Law Enforcement Agencies [CALEA], 2002). The costs associated with *disability* are high:

- Partial disability means a loss of flexibility in assignments
- Total disability results in a loss of valued personnel
- There is the expense of disability payments
- There is the expense of rehiring and retraining

One study estimated the cost of early disability at 165 percent of an officer's salary. Healthy officers miss fewer days of work, and they are

less likely to suffer diseases, thereby spending a smaller share of the agency's health care dollars. Finally, wellness increases loyalty, reduces turnover, and generally improves morale. Prevention of disease from hazardous law enforcement exposures depends on four fundamental tasks (Levy, Wagner, Rest & Weeks, 2005):

- Anticipation – of the potential for disease or injury
- Recognition – of occupational disease and injury. Ongoing gathering, analysis, and dissemination of data on the occurrence of disease and injury in law enforcement. Recognition can rely on existing data sources, such as death causes, workers' compensation, or health records.
- Evaluation – for helping to determine if a causal relationship exists. Basic parameters of relevance when measuring exposure to chemical and physical hazards are concentration or intensity of exposure; duration, frequency, and latency; and determinants of exposure. Additionally, it is necessary to look at health outcomes associated with hazards.
- Control – The precautionary principle of the public health is to prevent illness and injury even in the absence of thoroughly documented hazards.

## HAZARDOUS EXPOSURES IN LAW ENFORCEMENT

Law enforcement officers are often exposed to chemical hazards in the line of duty. Chemical hazards are classified as solids, liquids, or gases that most commonly enter the body by inhalation, ingestion, or absorption through the skin. Harmful effects depend on the nature of substances, the magnitude of exposure and dose, and the duration of exposure. As seen in Chapter 4 by Wirth, Vena, and Burch (this book), the predominant increased disease risk for officers routinely exposed to hazardous chemicals is cancer. This is evidenced by several police mortality studies (Feur & Rosenman, 1986; Finklestein, 1998; Pyorala, Miettinen, Laakso & Pyorala, 2000; Violanti et al., 1998). Other prevalent diseases associated with chemical exposure include lung disease, cardiovascular abnormalities, skin rashes, and blood-related diseases. Inhalation is the most common route of entry for chemical hazards, although chemicals may be ingested if they contaminate food, drink, or

smoking materials or are coughed up and swallowed. Evaluating the potential health effects of airborne particles (dusts, mists, and fumes) in law enforcement requires knowledge of their identity. Particle diameter determines the site of their deposition in the lung, which, in turn, determines the site of injury and whether the particle is absorbed systemically. Some explosive and flammable gases and vapors; organic particles, such as coal, grain, and sugar; and some metal aerosols, such as magnesium and aluminum, may also create risk of fire or explosion.

Biological hazards include infectious microorganisms, plant or animal toxins, and animals. Microorganisms may: (1) cause diseases such as viral hepatitis; (2) cause allergic reactions, such as those associated with molds; (3) deplete oxygen; or (4) produce toxic gases. Plants may produce toxins. Animals may attack and transmit infections to officers and others at the scene (for example, rabies).

## Clandestine Methamphetamine Labs

Hazards imposed by clandestine methamphetamine laboratories are a concern for law enforcement. In 2004 alone, there were 17,033 methamphetamine lab-related seizures by U.S. law enforcement agencies as reported by the Department of Justice (Mitka, 2005). Law enforcement personnel have been the most-studied population to date. Police officers exposed to active labs have a seven to fifteen-fold greater risk of becoming ill during response activities as compared to exposures to setup, in-transit, and former labs. They are also likely to be exposed to physical hazards such as spills, fires, explosions, and uncontrolled reactions. The poor handling and disposal of these chemicals, as well as the mixing of incompatible compounds, can create hazards. Common household chemicals used in meth labs include flammable and volatile solvents such as methanol, ether, benzene, methylene chloride, trichloroethane, and toluene (Table 1-1).

Other common chemicals include muriatic acid, sodium hydroxide, table salt, and ammonia. Meth-related chemicals not commonly found in large amounts in homes include anhydrous ammonia, red phosphorous, iodine, and reactive metals. Other hazardous chemicals can be formed during the "cooking" process. Many chemicals may contaminate a property after cooking meth. Carpeting, wallboard, ceiling tile, or fabric may absorb spilled or vaporized chemicals. Furniture or draperies may become contaminated. Outdoor disposal sites may also